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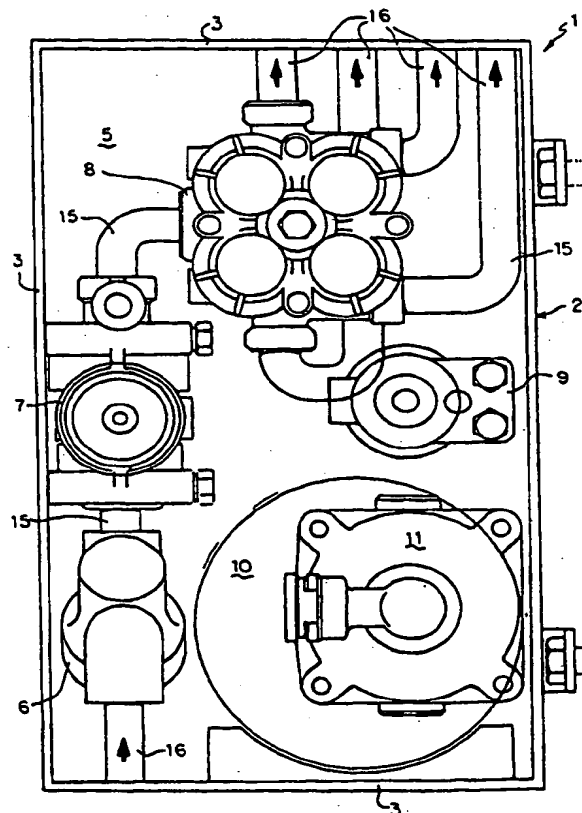
INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/BR95/00026</p> <p>(22) International Filing Date: 28 April 1995 (28.04.95)</p> <p>(30) Priority Data: PI 9401647-0 29 April 1994 (29.04.94) BR</p> <p>(71) Applicant (for all designated States except US): INDÚSTRIA FREIOS KNORR LTDA. [BR/BR]; Avenida Engenheiro Eusébio Stevaux, 873, Jurubatuba, SP (BR).</p> <p>(72) Inventors; and (75) Inventors/Applicants (for US only): PASTOR WAGNER, Thomas, Alexandre [BR/BR]; Rua Radônio, 12, Riviera Paulista, SP (BR). BOSCHIERO JUNIOR, Alcides [BR/BR]; Avenida Dr. Altino Arantes, 894/33, Vila Mariana, SP (BR).</p> <p>(74) Agent: DANNEMANN, SIEMSEN, BIGLER & IPANEMA MOREIRA; Caixa Postal 2142, Rua Marquês de Olinda, 70, Botafogo, 22251-040 Rio de Janeiro, RJ (BR).</p>		<p>(81) Designated States: US, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).</p> <p>Published With international search report.</p>

(54) Title: A BRAKE-SYSTEM MODULE FOR A VEHICLE

(57) Abstract

The present invention refers to a brake-system module, particularly pneumatic, hydraulic or mixed (pneumohydraulic) brakes for heavy vehicles, such as lorries, buses, railway cars, etc. The main objective of this invention is to provide a new conception of assembly of brake systems in vehicles, which drastically reduces the assembly and maintenance costs of the brake systems. According to the invention, such an objective is achieved by the provision of a brake-system module for a vehicle (1, 50, 100, 200) which embraces a definitive valve assembly and other pneumatic, hydraulic or mixed components (6-11, 55, 105-109, 205) which are common to all or almost all specific brake systems for each type of chassis. Such components (6-11, 55, 105-109, 205) are in fluid connection to each other and disposed on a support (5, 52, 101, 200), forming a standard module which is easily secured to the chassis of the vehicle and pneumatically connected to the other components of the brake system.



of the brake systems of the prior art are very expensive and little practical.

Disclosure of Invention

The objective of this invention is to propose a conception of assembling brake systems in vehicles which will eliminate the above-mentioned drawbacks, thereby drastically reducing the assembly and maintenance costs of the brake systems.

According to the invention, such an objective is achieved by the provision of a brake-system module which embraces a definite valve assembly and other pneumatic components that are common to all, or almost all, specific brake systems for each type of chassis. Such components are connected to each other and form a standard module which is easily secured to the chassis of the vehicle and pneumatically connected to the other components of the brake system.

The brake-system module for vehicle made in accordance with this invention comprises at least one inlet and one outlet for fluid and a plurality of components of the said brake system in fluid connection to each other and disposed on a support, said module being securable to a vehicle.

Brief Description of Drawings

The brake-system module of this invention will now be described in greater detail with reference to the accompanying drawings, wherein:

Figure 1 is a top plan view of a brake-system module for a vehicle, which represents a first preferred embodiment of this invention;

Figure 2 is a top plan view of a variant of the first embodiment of the invention;

Figure 3 is a longitudinal cross-section view of a brake-system module for a vehicle, which represents a second preferred embodiment of this invention; and

Figure 4 is a partial cross-section view of a modular block of a brake system which represents a third preferred embodiment of this invention.

Modes for Carrying Out the Invention

As shown in figure 1, the present inventive concept can be embodied through a brake-system module for a vehicle 1 comprising a substantially parallelepiped-shaped housing 2, 5 made preferably of metallic plates 3, among which there is a base-plate 5. The various components 6 through 11 of a pneumatic brake system are secured to this base plate 5, for instance by means of bolts (not shown).

Since the brake systems vary depending upon the vehicle, in both quantity and nature of the elements, as well as regarding the connections of the latter to each other, the modular systems which correspond to the preferred embodiments of this invention include only those components that are common to all of them, or at least to a great number of pneumatic 15 brake systems used today.

Among these common components the line filter 6, the pressure regulator 7, the protection valve or four-circuit valve 8, an automatic drain valve 9, an air drier 10 and a relay-valve 11 stand out. Such components 6 through 11 are 20 connected to each other through hoses 15, in order to form the desired pneumatic circuit.

It should be pointed out that the mentioned components 6-11, as well as the pneumatic circuit formed thereby are known from the prior art, for which reason they are not 25 included in the inventive concept described now.

The pneumatic inlets and outlets 16 of the circuit enclosed in the housing 2 have connection devices (not shown) for hoses (also not shown), which connect said circuit with the compressor of the vehicle and with the other components of 30 its brake system. Such connection devices can be provided with a thread or can be of the snap-fit type, for instance, those manufactured by Voss.

Preferably, the housing 2 has a cover (not shown), which is disposed parallel to the base plate 5, when closed. 35 The housing 2 can be secured by means of bolts to supports foreseen on the longeron of the chassis of the vehicle, between its back and front axles, or still directly on said longerons.

Thus, it can be seen that the utilization of the

module 1 greatly facilitates the assembly and maintenance work of brake systems, since it eliminates the steps of interconnecting and securing the components already included in said module 1 to the chassis of a vehicle.

5 Figure 2 shows a brake-system module 50 comprising a housing 51, also preferably made of metallic plates 52. Unlike the brake-system module 1 illustrated in figure 1, all the components 55 of the pneumatic brake system which integrate the present module 50 are secured directly to one of the
10 plates 52, which renders a base plate unnecessary, to which said components 55 are secured by means of bolts.

The securing of the components 55 to the plates 52 is preferably effected through connection devices 56, which connect the module 50 to the compressor of the vehicle and to
15 the rest of its brake system. Such connection devices 56 can be provided with a thread or be of the universal type or still of the snap-fit type, as for instance those manufactured by Voss.

However, it can be seen that the fastening of the
20 components 55 to the plates 52 can also be carried out by means of bolts.

Naturally, cover and base plates (not shown) can be secured to adequate edges of the plates 52, for the purpose of closing the housing 51, thus protecting the components 55
25 against the environment.

The housing 51 can be dimensioned so that at least some of the components 55 will be pneumatically interconnected through the rigid connectors 57, in order to guarantee the fastening of the components 55. There are also provided hoses
30 58 which connect some components to the connection devices 56.

As already mentioned, the housing 51 can be secured through bolts to supports foreseen on the longeron of the chassis of the vehicle, between the back and front axles, or still directly to the said longerons.

35 The second preferred embodiment of this invention, illustrated in figure 3, is a brake-system module 100 which comprises a distributing plate 101 having a support face 102 to which, for instance, the components 105 - 109, which are common to various specific types of pneumatic brake systems,

are secured through bolts.

The module 100 includes a pressure regulator 105, a test connection 106, a magnetic valve or solenoid valve 107, two distributing valves 108 and a two-way valve 109. Such components 105 and 109, as well as the circuit formed ther by are in themselves known from the prior art, for which reason they are not part of the scope of the present invention.

According to this invention, such components 105-109 are pneumatically connected to each other through the tubes 115, formed in the distributing plate 101 itself, thereby making the use of hoses for interconnection of the components 105-109 unnecessary.

The tubes 115 are formed in the distributing plate 101 already at the time of their casting or subsequently by machining processes.

Although the distributing place 101 is preferably parallelepiped-shaped, in order to facilitate its handling, it can have other shapes without departing from the inventive concept described now.

In the same way as the brake-system modules 1 and 50, the pneumatic inlet and outlet 116 of the brake-system module 100 have connection devices 117 for hoses (not shown), which connect the circuit formed by the components 105-109 to the compressor of the vehicle and with the other components of its brake system.

Such connection devices 117 can be provided with a thread or can be of the snap-fit type, as for instance those manufactured by Voss. Moreover, the connection devices 117 can be positioned on any of the faces of the distributing plate 101.

As already known from the technique, a pressure interruptor (not shown) can be associated to the test connection 106, which interruptor actuates when the pressure at determined critical points of the circuit exceeds predetermined values. Thus, any abnormality or loss of function of the brake system can be reported to the driver by means of a sound or light signal.

In addition, the distributing plate 101 and the components 105-109 secured thereto can be partly or totally in-

volved by a rigid protecting envelop (not shown). Moreover, the distributing plate 101 can be fixed through bolts to supports provided on the longeron of the chassis of the vehicle, between its back and front axles, or directly to the 5 longerons of the chassis.

A third preferred embodiment of this invention is illustrated in figure 4 and is a modular block of a brake-system 200, preferably metallic, inside which cavities 201 are formed, which enclose, at least in part, the components 205 10 common to the various specific types of pneumatic brake systems, which are pneumatically connected to each other through tubes 210, also formed in the modular block 200 itself.

As illustrated in figure 4, it is not possible to imbed each of the pneumatic components 105 entirely in the 15 block 200, since their adjustment and connection elements must be projecting outwardly. However, the fact that at least part of these components 205 are formed integral in the block 200, as well as their interconnection tubes 210, results in significant advantages, avoiding the use of hoses for connecting the 20 components 205. Besides, the manufacture and maintenance of the modular blocks of brake systems 200 are quite simpler than those of the prior art.

According to this invention, the cavities 201 and the tubes 210 are formed in the block 200 at the moment of 25 their casting, or subsequently through machining processes.

In the same way as the modules of the brake systems 1, 50 and 100, the pneumatic inlet and outlet 215 of the modular block 200 have connection devices 216 for hoses (not shown), which connect the circuit formed by the components 30 205-207 to the compressor of the vehicle and to the other components of its brake system.

Such connection devices 216 can be provided with thread or can be of the snap-fit type, as for instance those manufactured by Voss. Moreover, the connection devices 216 can 35 be positioned on any one of the faces of the modular block 200.

In addition, the modular block 200 can be secured, through bolts, to supports provided on the longeron of the chassis of the vehicle, between its back and front axles, or

directly to the longerons of the chassis.

In view of the above considerations, it can be seen that the present invention does not relate to technical and functional features of the brake system themselves, be it with regard to its various components or the circuit which the latter form when interconnected.

The present invention refers basically to a new conception of a brake-system module having a support to which components common to a great number of specific brake systems are secured. Such a module is mounted on a chassis of a vehicle in a simple and rapid manner, and the maintenance of said components is greatly facilitated.

According to some preferred embodiments of this invention, the components present in said module are connected to each other through tubes formed in the support itself.

On the other hand, one should bear in mind that the present inventive concept can be applied without relevant alterations to hydraulic or mixed (pneumo-hydraulic) brake systems.

Finally, the embodiments described above are given only by way of example, the scope of this invention being defined in the appended claims.

CLAIMS

1. A brake-system module for a vehicle (1, 50, 100, 200), particularly usable in pneumatic, hydraulic or mixed brake systems, characterized by comprising a plurality of components (6-11, 55, 105-109, 205) of said brake system in fluid connection to each other and disposed on a support (5, 52, 101, 200) and at least one inlet and one outlet for fluid (16, 116, 215); and additionally in that the module (1, 50, 100, 200) is fastenable to a vehicle.
- 10 2. A module (100, 200) according to claim 1, characterized in that the components (105-109, 205) of said brake system are connected to each other through tubes (115, 210) formed inside the support (101, 200).
3. A module (1) according to claim 1, characterized
15 in that the components (6-11) of said brake system are connected to each other through hoses (15).
4. A module (1, 50, 100, 200) according to claim 2 or 3, characterized in that the inlet and the outlet of fluid (6, 116, 215) are operatively associated to snap-fit devices
20 (56, 117, 216).
5. A module (200) according to claim 2, characterized in that said support includes a modular block (200), in which cavities (201) are formed, which house at least part of respective components (205) of said brake system.
- 25 6. A module (50) according to claim 1, characterized by comprising a housing (51) formed by plates (52), the components (55) being secured directly to the plates (52).

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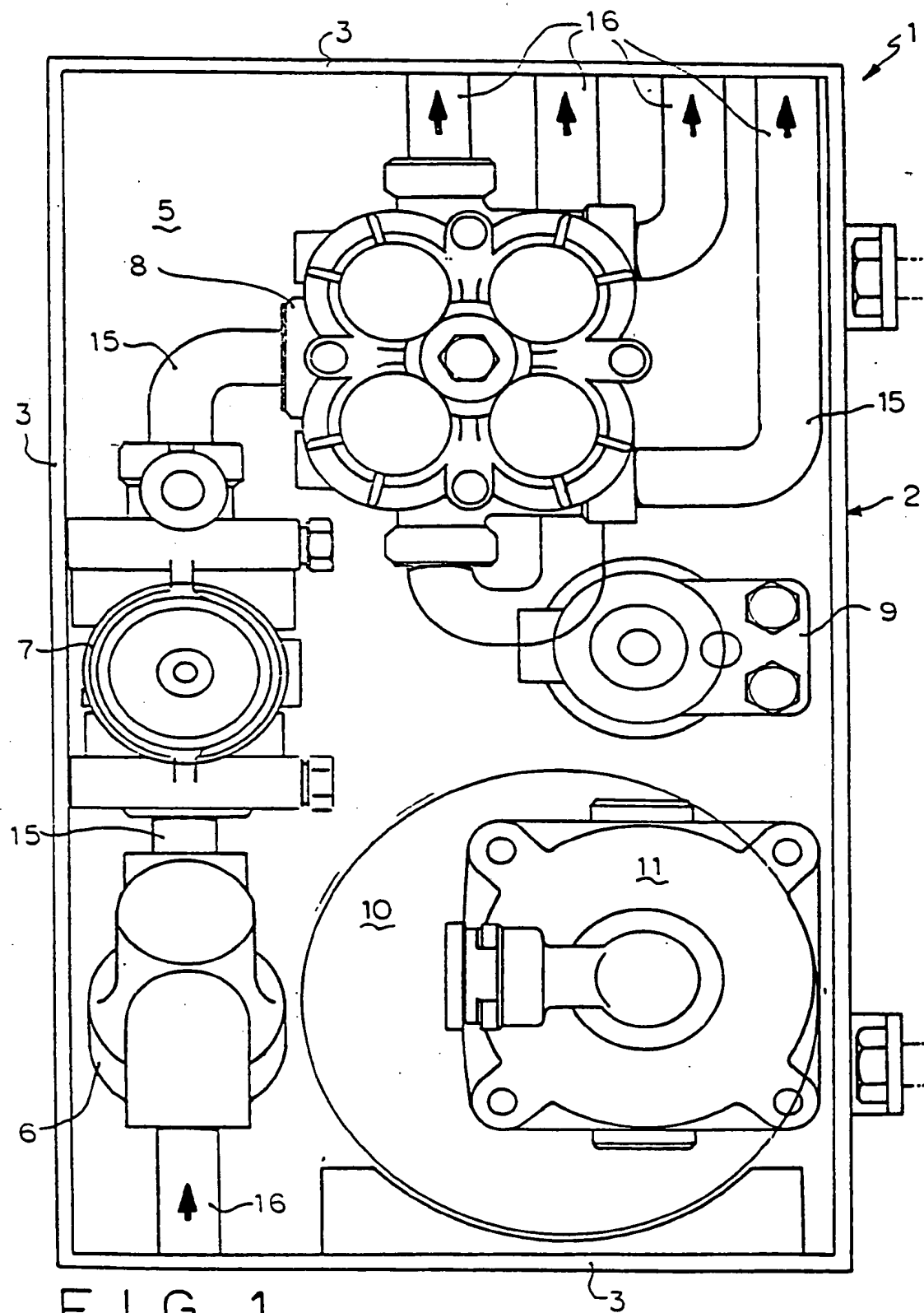
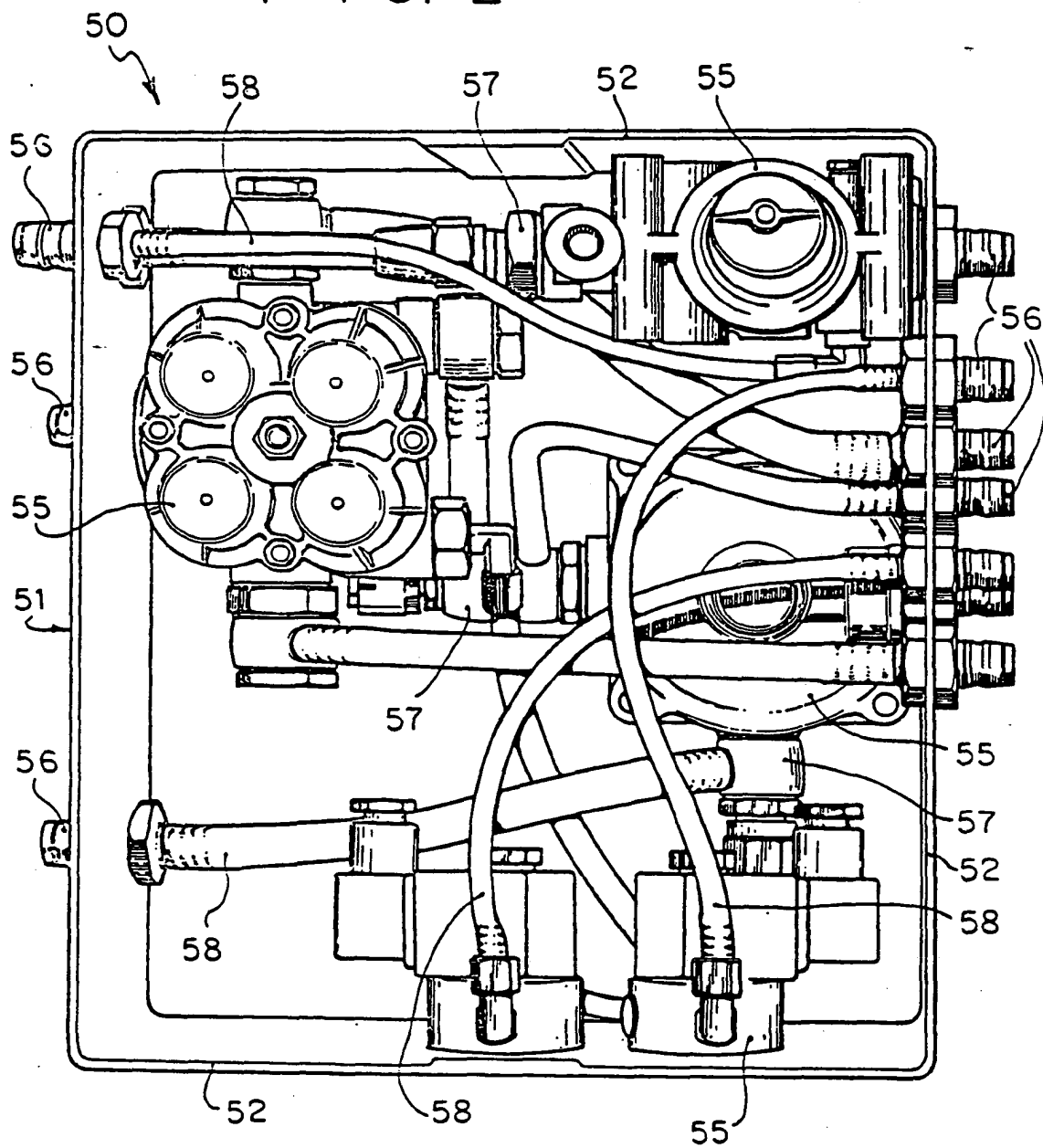


FIG. 2



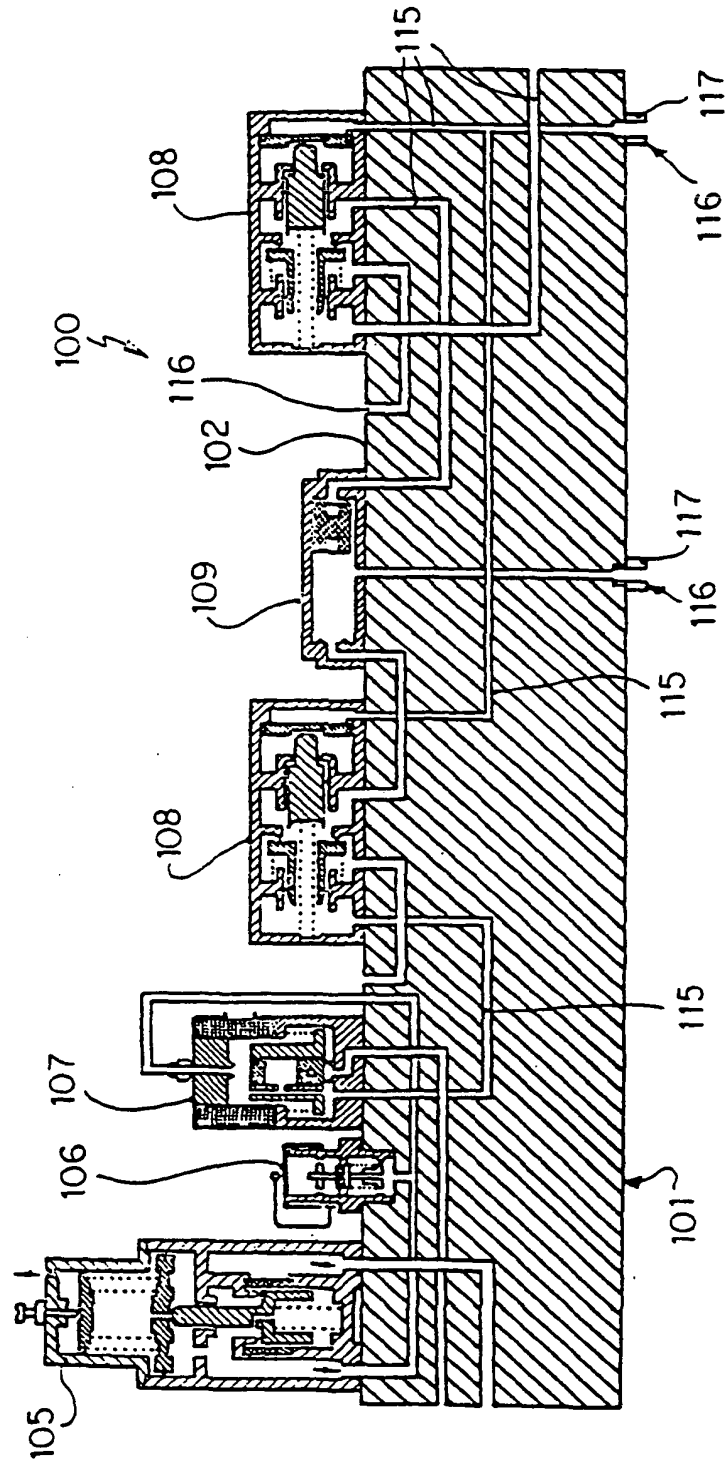
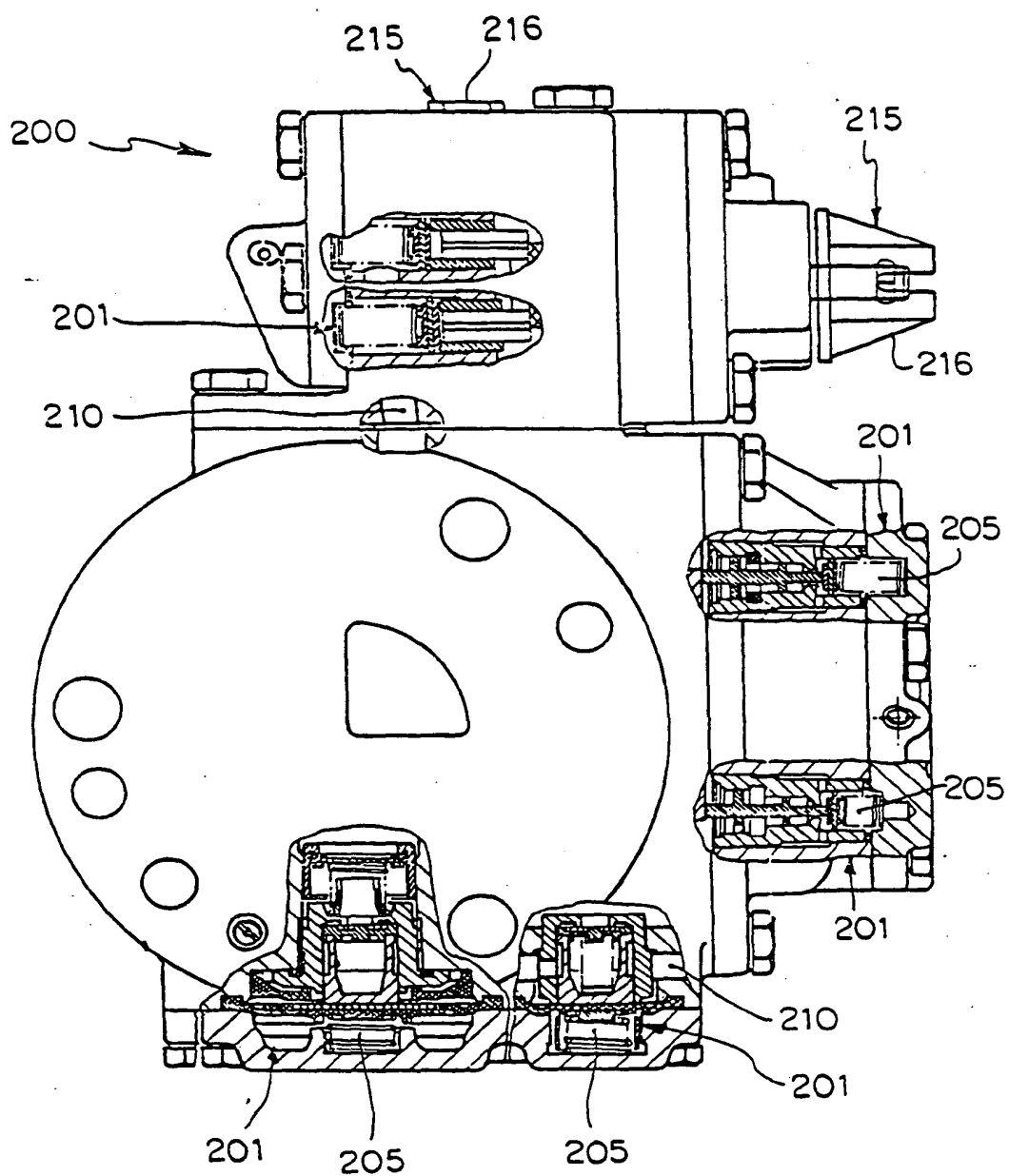


FIG. 3

FIG. 4



INTERNATIONAL SEARCH REPORT

International Application No
PCT/BR 95/00026

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 B60T17/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 B60T

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB-A-1 262 482 (CLAYTON DEWANDRE) 2 February 1972 see page 1, line 8 - line 48 see page 2, line 84 - page 97; figures	1,2,5
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X	DE-A-35 14 989 (KNORR-BREMSE) 30 October 1986 see page 3, line 17 - line 24 see page 4, line 11 - line 25 see page 5, line 6 - line 21 see page 10, line 8 - line 13; figures 3-8	1,2,5
X	FR-A-2 283 805 (ROBERT BOSCH) 2 April 1976 see page 1, line 1 - line 31; claim 1; figures	1,3,6
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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- *A* document defining the general state of the art which is not considered to be of particular relevance
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- *&* document member of the same patent family

Date of the actual completion of the international search

26 July 1995

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INTERNATIONAL SEARCH REPORT

International Application No.
PCT/BR 95/00026

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A	see column 7, line 29 - line 33; figure 2 ---	4
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International Application No
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